

A Data Driven Exploration of Human Development Index (HDI)

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GIT HUB repo:

https://github.com/pratushcfc/2501578_Pratush_Devkota_AI

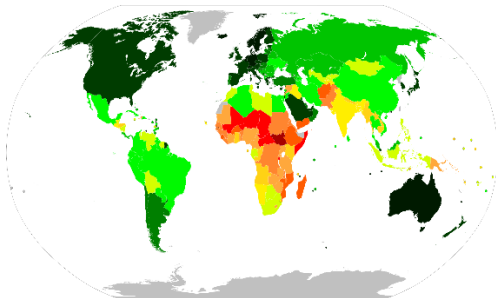
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Introduction

Human development index also known as HDI is used by the united nations to find about countrys development entirely . As, It is used to evaluate development based on key things like health which directly affects life expectancy, literacy which directly links to the education and incomes linking out with standard of living also known as gross national income per capita.

In this assessment the objective is to perform statical representations aswell as EDA also known as exploratory data analysis on the Human development index csv file having data of it from 1990 to 2022. The main reason of the analysis is to explore HDI pattern and also identify trends , compare country regions and also understand relationship between HDI and other indicators .python libraries like pandas , numpy , Matplotlib and seaborn where used in this task to analyze aswell as to visualize the data .



2. Problem 1A:

Methodology:-

The dataset was looked at to find the years in it. We picked the most recent yr which is 2022 to take a closer look. When we cleaned up the data we did a things. We removed the rows that were the same. We also made sure the numbers were in the format.. We had to deal with the missing information. If a row was missing the HDI value we got rid of it. This is because the HDI value is the way to measure how well a place is doing. If we filled in the missing HDI values it could give us answers, about the Human Development Index. So we threw away the rows with missing Human Development Index values to make sure our results were accurate.

Key Findings

- The information we have for the year 2022 includes Human Development Index values for the dataset and the dataset has Human Development Index values for countries, in different parts of the world.
- The average middle value and spread of Human Development Index were calculated to see how Human Development Index is spread out overall.
- Countries having a high Human development Index value are mostly countries that are already developed

	id	country	year	hdi	life_expectancy	pop_millions	hdi_1	hdi_m	life_expect_1	...	gender_development	gender_inequality	
3332	3333	LIE	Liechtenstein	2022	0.942	84.656	0.039327	0.924163	0.974295	86.129	...	0.949	NaN
4718	4719	QAT	Qatar	2022	0.875	81.559	2.695122	0.892561	0.869100	83.101	...	1.027	0.212
5213	5214	SGP	Singapore	2022	0.949	84.133	5.975689	0.945325	0.954078	86.295	...	0.991	0.036
2705	2706	IRL	Ireland	2022	0.950	82.716	5.023109	0.942838	0.951392	84.412	...	0.991	0.072
3398	3399	LUX	Luxembourg	2022	0.927	82.591	0.647599	0.920482	0.927311	84.770	...	0.993	0.043
6104	6105	ARE	United Arab Emirates	2022	0.937	79.196	9.441128	0.922940	0.936027	81.412	...	0.986	0.035
5609	5610	CHE	Switzerland	2022	0.967	84.255	8.740472	0.949369	0.977383	85.932	...	0.971	0.018
4322	4323	NOR	Norway	2022	0.966	83.393	5.434319	0.957148	0.970415	85.055	...	0.986	0.012
6170	6171	USA	United States	2022	0.927	78.203	338.289857	0.927693	0.923405	81.015	...	1.005	0.180
2474	2475	HKG	Hong Kong, China (SAR)	2022	0.956	84.315	7.488865	0.942671	0.969515	86.893	...	0.972	NaN

-Ranking of Countries based on HDI and GNI

- Countries with low HDI values were mostly from less developed regions as every country in a same region have less hdi values.

The country that did well in 2022 was the one with the highest Human Development Index. On the hand the country with the lowest Human Development Index showed us that there is a big difference in how well countries are doing. This is a problem because it means some countries are not developing fast as others and that is not fair. The Human Development Index is important because it helps us see how countries are doing. The country, with the human development index is a good example of how some countries need more help to catch up with the rest of the world.

HDI Category	
Very High	71
High	53
Medium	45
Low	35

-hdi category of country all around the world

HDI Classification

The United Nations Development Programme classified countries into four Human Development Index categories. These human development index were defined by the United Nations Development Programme. The countries were put into these four Human Development Index categories

- Low HDI
- Medium HDI
- High HDI
- Very High HDI

The classification really helped us see how different countries are doing. We saved the list of countries, with their HDI categories and sent it in with our work.

3. Problem 1B:

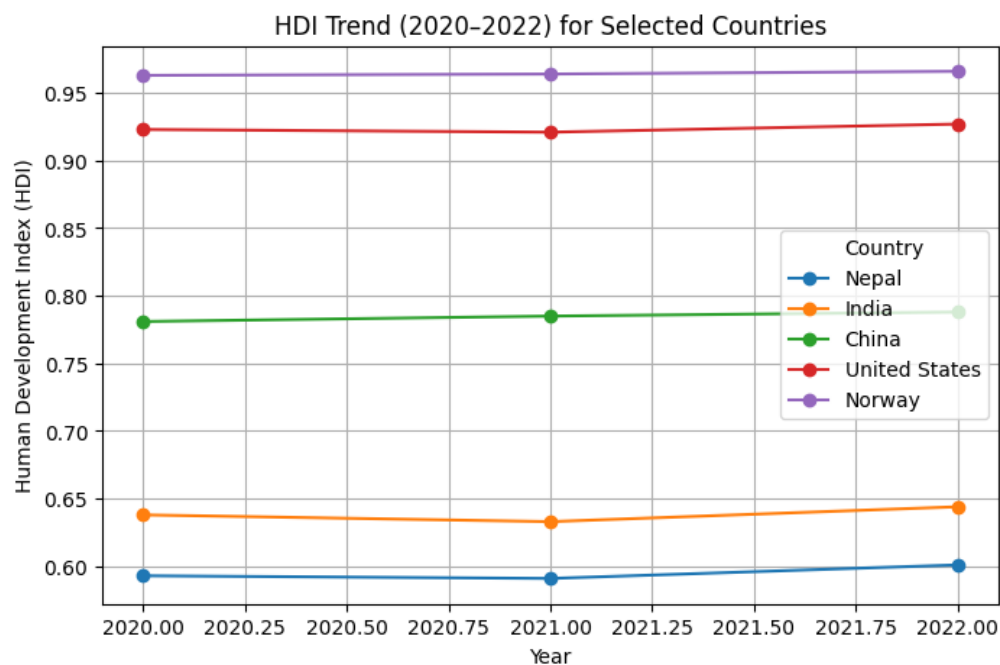
Methodology:-

The date we looked at closely to only include the years 2020 2021 and 2022. We made sure the important information like country, year and Human Development Index was complete. If anything was missing we fixed it. Then we made a lot of pictures to see what the Human Development Index trends looked like over time, for the Human Development Index. Also, we made a column having region from county .

Analysis :-

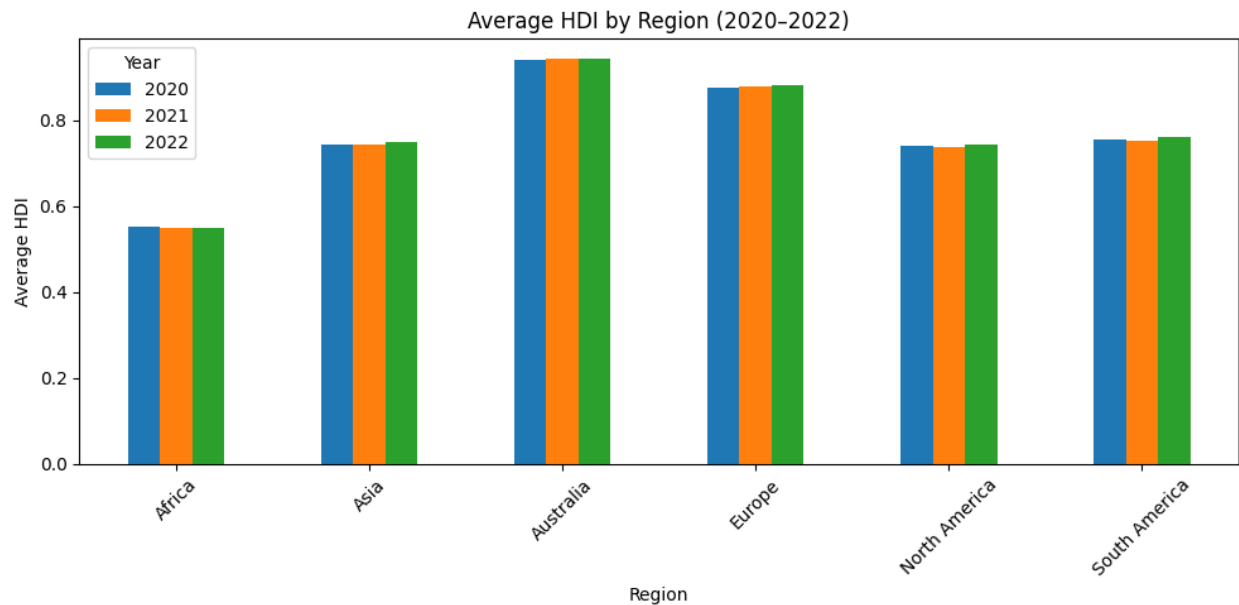
- Line Chart (HDI Trends):

We selected random five countries which shows that things got a little better for most of them over time.. Some countries did not get better and even got a bit worse when the pandemic happened. The Human Development Index trends for these five countries were going up. But for some of them due to pandemic it was rough.



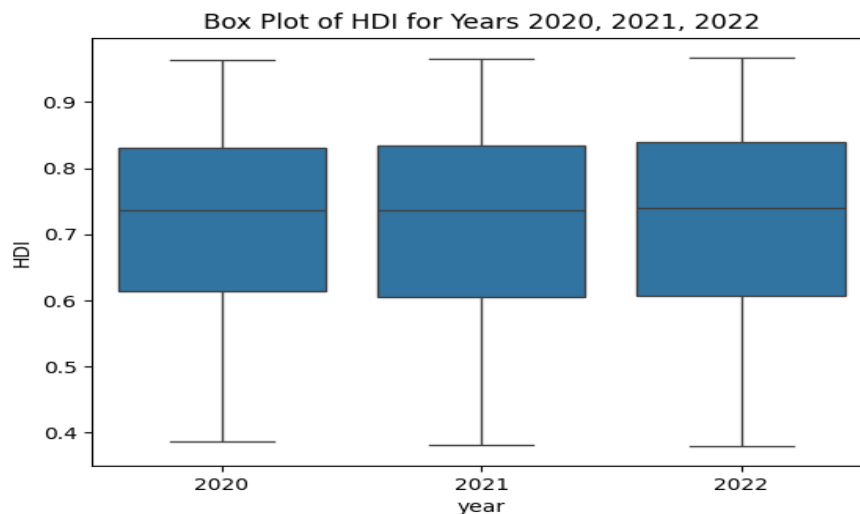
Bar Chart :

Some places like Australia Europe and North America have had a high average HDI values. These hdi values are a lot higher than the ones you see in South Asia and Africa. The Human Development Index, in Europe and North America are always higher. This is something that is seen all the time when we compare Europe ,North America to South Asia and Africa in terms of Human Development .



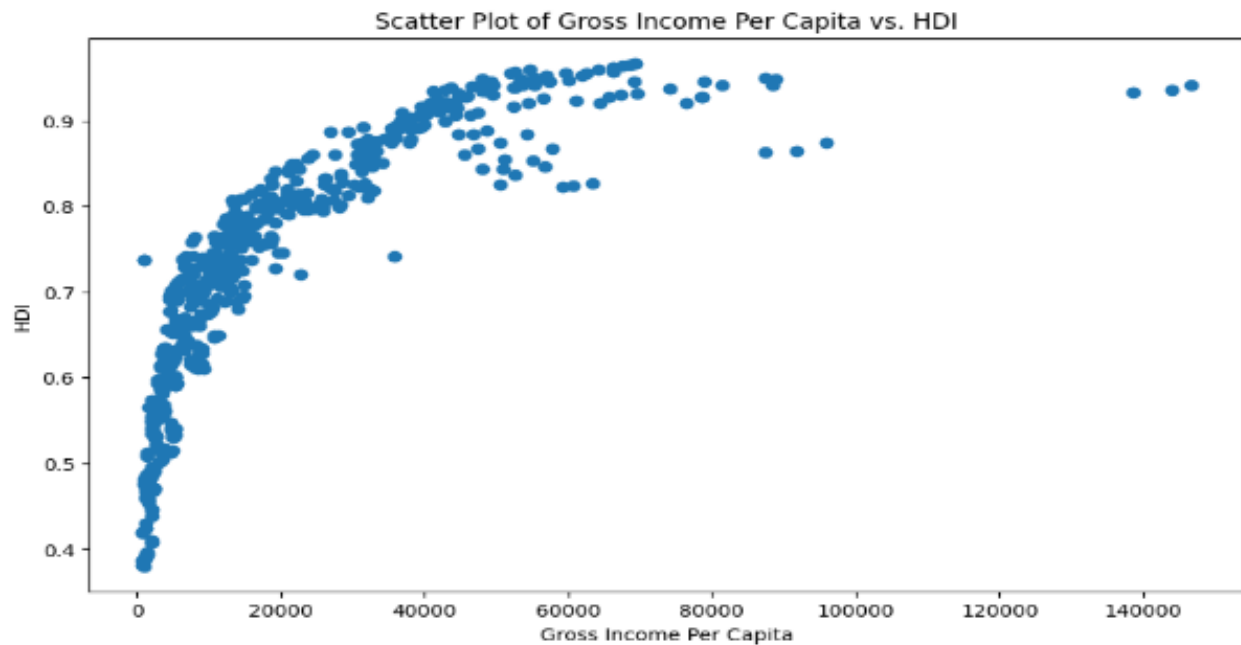
• Box Plot:

The way the Human Development Index is changes out over the years does not have impacted much. There are some drop in the Human Development Index during 2020. The pandemic probably caused these drops in the Human Development Index.



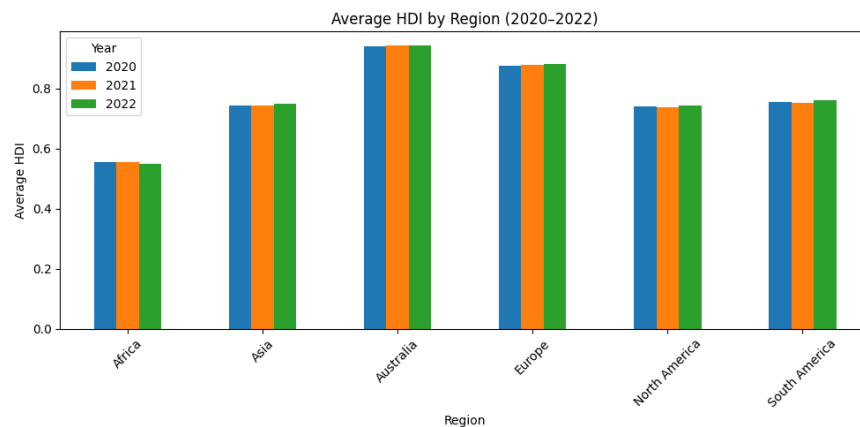
- Scatter Plot HDI vs GNI per Capita:

There is very proportional relationship between the Human Development Index and the amount people earn. When people have good amount of money then they usually have better lives and a better living standards. The Human Development Index and the money people earn per year are related in a way. Which means that people who have incomes tend to have better human development.



Short Analysis:-

- Many countries got better in the Human Development Index from 20 to 22 because the Human Development Index increased when countries started to do again after the pandemic. The Human Development Index showed this improvement in countries.
- Some countries had a time because of the pressure that pandemic put on their healthcare system and the problems it caused for their economy. Pandemic was the reason for a lot of issues. The healthcare system in these countries was really struggling because of pandemic. At the time pandemic also caused big problem for the economy of these countries.
- Places that are developed have the average HDI and places that are still developing have the lowest HDI. Developed regions, like these have a high Human Development Index or HDI for short and developing regions have a very low Human Development Index or HDI.



4. Problem 2: Advanced HDI Exploration (South Asia)

Methodology

Some countries in South Asia were chosen, like Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.

The people who did this study made a score for these countries.

They used two things to calculate this score: how long people live and how much money people have, in these South Asian countries, specifically Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.

Key Findings

- Countries were ranked based on the score that combined all the factors and the top five countries were shown on a chart with bars.
- We can see that there are differences between the Human Development Index ranking and the composite score ranking. This shows that how much money a country has does not totally decide the level of development. The Human Development Index ranking and the composite score ranking are not the same, which means that the Human Development Index ranking and the composite score ranking have views, on human development.
- Outlier detection using the IQR method highlighted countries with unusually high or low income compared to their HDI.

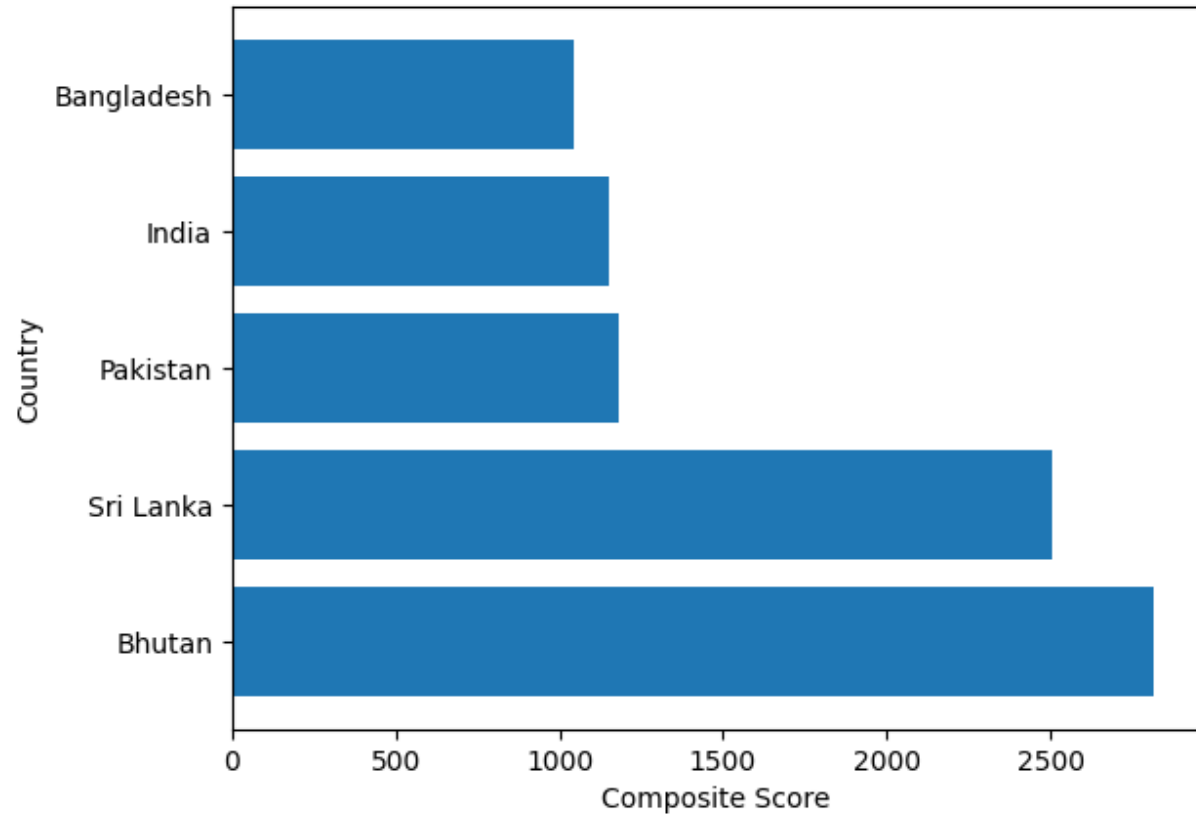
Metric Relationships

When we look at how things are connected we see that how long people live is more closely related to the Human Development Index than, to some other measures. This shows just how important the Human Development Index is when we are trying to understand how well people are doing in life. The Human Development Index really matters when we are assessing development.

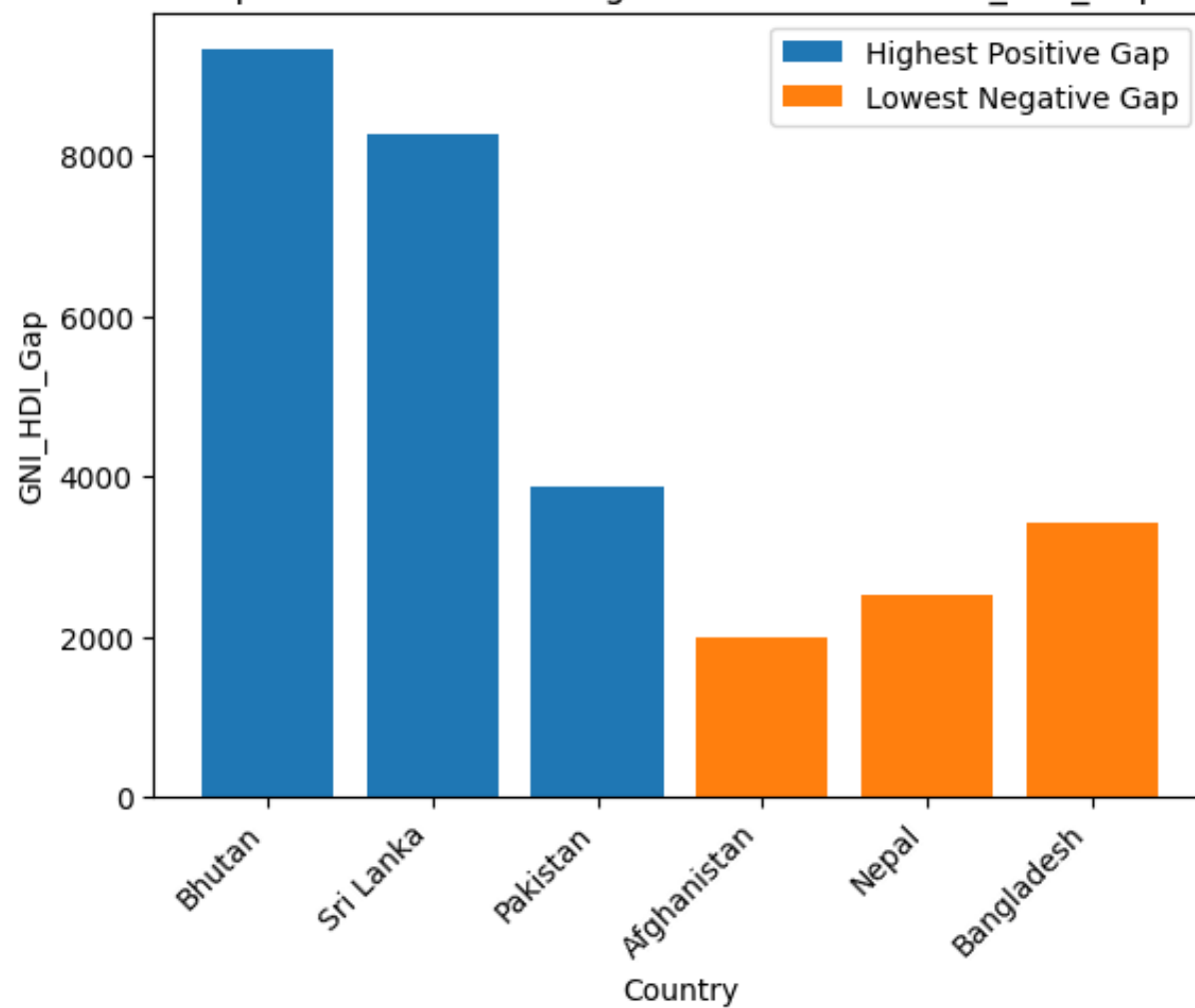
Gap Analysis

The difference between the Gross National Income and the Human Development Index is really interesting. When we look at the GNI and the HDI we find that people who have money do not always have a better life. This shows us that education and health are very important for a country to develop. The GNI-HDI gap analysis is useful because it helps us understand the role of education and health, in development and how the GNI and the HDI are related.

Top 5 Countries with Highest Composite Score



Top 3 Countries with Highest and Lowest GNI_HDI_Gap



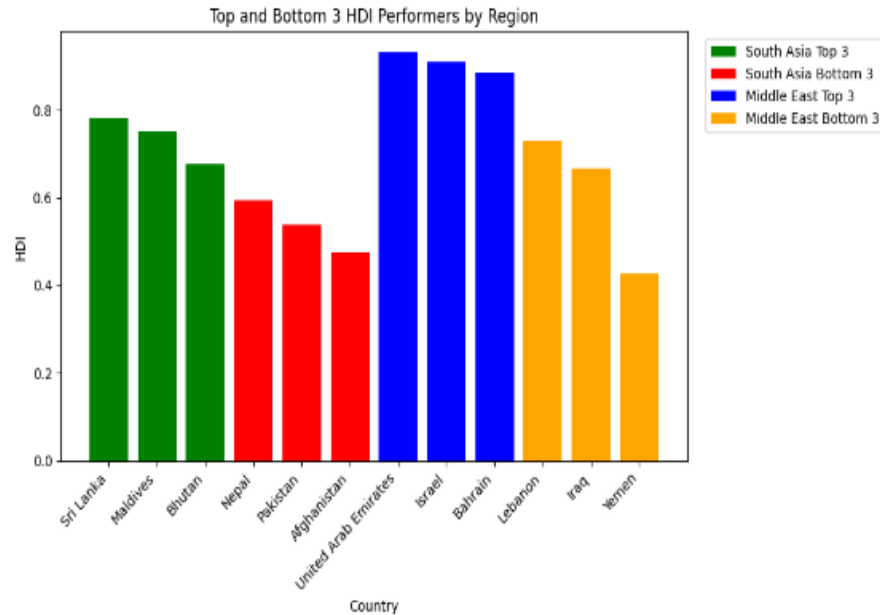
5. Problem 3:

Methodology

They made datasets for South Asia and the Middle East for the years 2020 to 2022. To see how South Asia and the Middle East are different they used statistics, rankings and pictures to compare the two regions. They looked at South Asia and the Middle East to find out what makes them different.

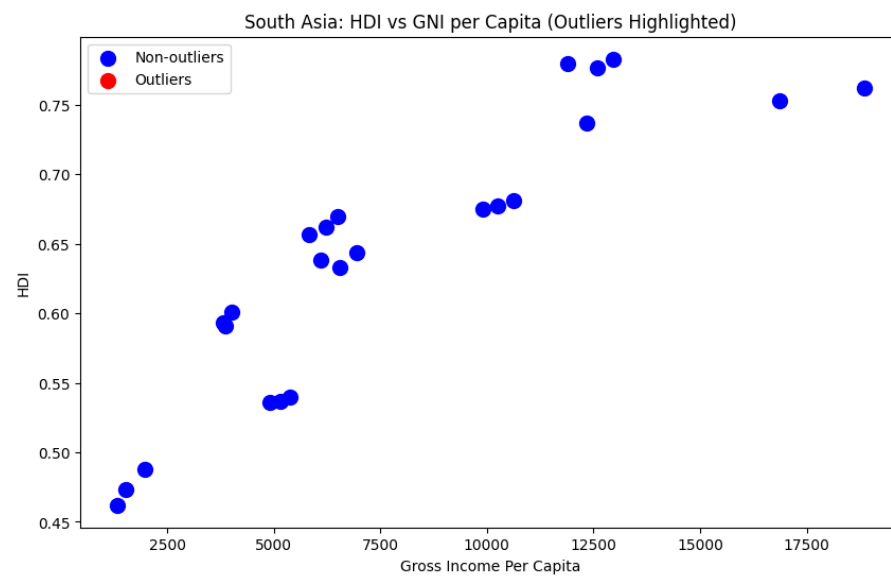
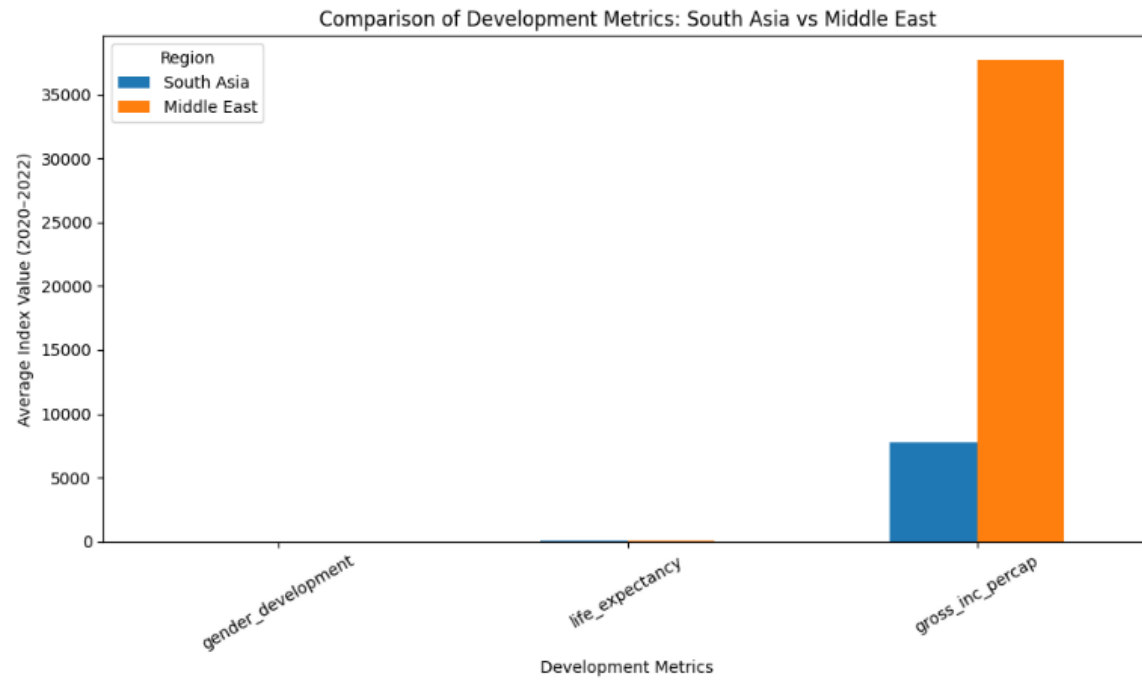
Key Findings

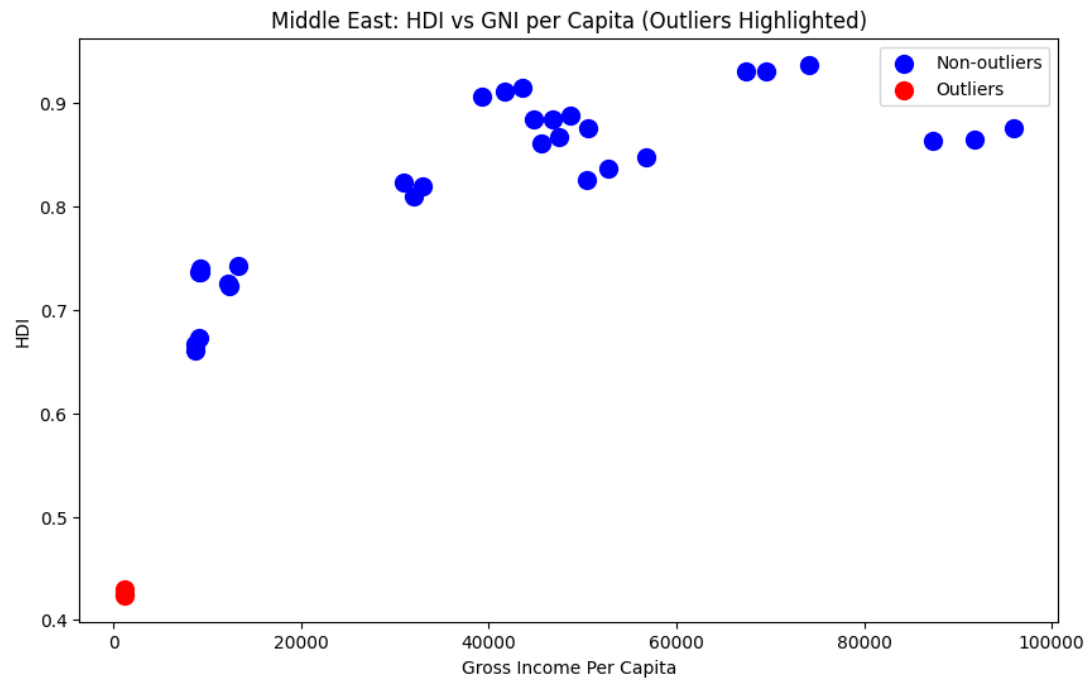
- The Middle East region had a life quality, than South Asia because the Middle East region had a higher average Human Development Index the Human Development Index is what we use to measure this so the Middle East region showed a higher average Human Development Index compared to South Asia.
- South Asia has a lot of differences in human development index (hdi) values, which explains that the region is not developing evenly and that human development index values in South Asia are all over the place.
- difference are in how men and women develop and live in these two areas. The number that show life expectancy or in simpler terms life span in the region has a very vast difference . as, when we look into south asia with middle east south asia lack behind . This is what the gender development and life expectancy indices tell us about these two regions.



- When we looked at how things are connected we found that there is a link between the human Development index and how long people live in both areas. The Human Development Index as well as life expectancy are very related in many ways in these regions. We can see that the human development index and life expectancy have a very vast relationship.

The findings show that it is really important to have development policies that focus on improving the quality of life for people. This means that development policies should not just be about increasing the amount of money a country makes. The analysis is useful because it gives us an idea of how different countries and regions are developing. It looks at regional development patterns. The findings of the analysis are helpful even though there are some problems, with it like missing information and the way it scores things. The quality of life is what matters, not the economic output of a country.





Appendix

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